

BTEC SCIENCE

Periodic table of the elements



1. Polonium and Radium

[209]
Po
Polonium
84

226
Ra
Radium
88

a. Marie Curie won two Nobel Prizes for her research on radioactivity and the discovery of polonium and radium in 1898.

2. Samarium and Gadolinium

150
Sm
Samarium
62

157
Gd
Gadolinium
64

a. In 1875, the American chemist Ellen Swallow Richards was analysing the mineral samarskite when she found an unidentifiable residue. That residue later turned out to consist of the two new elements: samarium and gadolinium.

3. Protactinium

[231]
Pa
Protactinium
91

a. Austrian-Swedish nuclear physicist Lise Meitner and her colleague Otto Hahn first proved the discovery of element 91, protactinium, in 1917-1918. During their research, she was forced to work in the basement because women were not supposed to be seen.

Key																							
Non-metal	Alkali metal	Alkaline earth metal	Transition metal	Metal																			
Metalloid	Halogen	Noble gas	Lanthanide	Actinide																			
1.0 H Hydrogen 1																	4.0 He Helium 2						
6.9 Li Lithium 3	9.0 Be Beryllium 4																	10.8 B Boron 5	12.0 C Carbon 6	14.0 N Nitrogen 7	16.0 O Oxygen 8	19.0 F Flourine 9	20.2 Ne Neon 10
23.0 Na Sodium 11	24.3 Mg Magnesium 12																	27.0 Al Aluminum 13	28.1 Si Silicon 14	31.0 P Phosphorus 15	32.1 S Sulfur 16	35.5 Cl Chlorine 17	39.9 Ar Argon 18
39.1 K Potassium 19	40.1 Ca Calcium 20	45.0 Sc Scandium 21	47.9 Ti Titanium 22	50.9 V Vanadium 23	52.0 Cr Chromium 24	54.9 Mn Manganese 25	55.8 Fe Iron 26	58.9 Co Cobalt 27	58.7 Ni Nickel 28	63.5 Cu Copper 29	65.4 Zn Zinc 30	69.7 Ga Gallium 31	72.61 Ge Germanium 32	74.9 As Arsenic 33	79.0 Se Selenium 34	79.9 Br Bromine 35	84.8 Kr Krypton 36						
85.5 Rb Rubidium 37	87.6 Sr Strontium 38	88.9 Y Yttrium 39	91.2 Zr Zirconium 40	92.9 Nb Niobium 41	95.9 Mo Molybdenum 42	[98] Tc Technetium 43	101.1 Ru Ruthenium 44	102.9 Rh Rhodium 45	106.4 Pd Palladium 46	107.9 Ag Silver 47	112.4 Cd Cadmium 48	114.8 In Indium 49	118.7 Sn Tin 50	121.8 Sb Antimony 51	127.6 Te Tellurium 52	126.9 I Iodine 53	131.3 Xe Xenon 54						
132.9 Cs Cesium 55	137.3 Ba Barium 56	57-71*	178.5 Hf Hafnium 72	180.9 Ta Tantalum 73	183.8 W Tungsten 74	186.2 Re Rhenium 75	190.2 Os Osmium 76	192.2 Ir Iridium 77	195.1 Pt Platinum 78	197.0 Au Gold 79	200.6 Hg Mercury 80	204.4 Tl Thallium 81	207.2 Pb Lead 82	209.0 Bi Bismuth 83	[209] Po Polonium 84	[210] At Astatine 85	[222] Rn Radon 86						
223 Fr Francium 87	226 Ra Radium 88	89-103**	[261] Rf Rutherfordium 104	[262] Db Dubnium 105	[266] Sg Seaborgium 106	[264] Bh Bohrium 107	[269] Hs Hassium 108	[268] Mt Meitnerium 109	[269] Ds Darmstadtium 110	[272] Rg Roentgenium 111	[277] Cn Copernicium 112	Unknown Uut Ununtrium 113	[289] Fl Flerovium 114	Unknown Uup Ununpentium 115	[298] Lv Livermorium 116	Unknown Uus Ununseptium 117	unknown Uuo Ununoctium 118						
138.9 La Lanthanum 57	140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	[147] Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	163 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71									
227 Ac Actinium 89	232 Th Thorium 90	[231] Pa Protactinium 91	238 U Uranium 92	[237] Np Neptunium 93	[242] Pu Plutonium 94	[243] Am Americium 95	[247] Cm Curium 96	[245] Bk Berkelium 97	[251] Cf Californium 98	[254] Es Einsteinium 99	[253] Fm Fermium 100	[256] Md Mendelevium 101	[254] No Nobelium 102	[257] Lr Lawrencium 103									

4. Rhenium

186.2
Re
Rhenium
75

a. In 1925, German couple Ida and Walter Noddack jointly discovered element 75, rhenium. The element, named after the Rhine River, is one of the rarest substances on earth.

5. Francium

223
Fr
Francium
87

a. In 1939, Marguerite Perey discovered francium on her own. This was the last naturally occurring element that could be extracted from minerals.

Did you know?

- British radiochemist Frederick Soddy developed the idea that several elements could have the same atomic mass, which led to Scottish doctor Margaret Todd coining the term "isotope," meaning "same place" in Greek.
- Russian scientist Julia Lermontova worked on separating the platinum-group metals (ruthenium, rhodium, palladium, osmium, iridium and platinum) as early as the 1870s.
- The letter "J" is the only one not found on the periodic table. In some countries (e.g., Norway, Poland, Sweden, Serbia, Croatia), the element iodine is known by the name jod. However, the periodic table still uses the IUPAC symbol I for the element.